HIGH IMPACT GATE

This invention relates to a security gate. It is particularly related to a high impact gate able to withstand significant direct impact of vehicles and maintain a secure location by prevention of access by vehicle or foot.

Barriers of all types are used throughout the world to prevent intrusion into restricted areas or retain personnel or goods within restricted areas. Intruders include unwanted personnel, animals, and vehicles. At times personnel and goods must enter or leave restricted areas, resulting in the requirement for at least part of the barrier to be movable. Movable barriers, such as gates, doors, and movable portions of walls, allow passage out of and into restricted areas. However they greatly reduce the barrier effect and usually rely on being merely a demarcation line requiring security personnel to patrol and form the effective control barrier. Such an approach is not sufficient in these times.

In granted US Patent No 4,828,424 there is shown a vehicle security barrier for selectively prohibiting a vehicle from accessing a preselected area and for otherwise controlling vehicular traffic. The security barrier comprises a base defining a travelway over which a vehicle can be driven. The base comprises a forward end portion defining an entryway whereby a vehicle enters onto the travelway and a rearward end portion defining a travelway exit whereby a vehicle exits the travelway. The security barrier further comprises a security gate pivotally mounted on the base for being selectively raised to obstruct the travelway and prohibit a vehicle from exiting the travelway via the travelway exit. Reciprocal actuating means are also provided for selectively raising and lowering the gate. In the preferred embodiment, the reciprocal actuating means comprises a first and second fluid actuated cylinder. In another embodiment, sacrificial gate support means are provided for absorbing the energy of a speeding vehicle, thereby minimizing structural damage caused by the impact of such a vehicle. However this patent only discloses the need for a collapsible structure in order to perform the impact security system. The system does not allow ready opening in combination with high security.

Granted US Patent No 5,624,203 describes a restraining barrier which is positionable across a roadway in a deployed position to define a restraining zone and may is moved vertically to a passive position by first and second transport members slideably mounted to first and second towers on either side of the roadway. The barrier may is a rectangular net. First and second cables each support an opposite end of the barrier to the said first and second transport means, respectively, and also couple the barrier to an energy absorber. The cable includes a support cable which also responds to the impact of a vehicle as by breaking. The cable is coupled to an operate indicator for producing a signal indicating the vehicle impact. Clearly such a structure must be lightweight in order to allow the ready lifting or require a substantial movement mechanism if heavy duty structures are to be used. Such a system therefore is not practical for high impact security systems.

In granted US Patent No. 5,823,705 there is disclosed a restraining barrier that is positionable across a roadway in a deployed position to define a restraining zone and may is moved vertically to a passive position by first and second transport components. Opposite ends of the barrier are coupled to the first and second transport components, respectively, and also couple the barrier to first and second energy absorbers of differing restraintive force in order stop vehicles of varying weight. A support cable is coupled to an indicator for providing a signal indicating vehicle impact. Additionally, a series of restraining barriers and energy absorbers may provide a series of sequentially differing restraintive forces to stop lightweight and heavier vehicles. The barrier may is a net and include a lower wire below the net assuring effective trapping of autos and trucks of a variety of heights. However such a structure of restraining barrier is not acting as a security system as it readily allows smaller articles such as people to gain access to the restricted area. Further, such net restraint systems do not provide a visual barrier that looks substantial and has a deterrent value and the system does not provide an effective barrier to a second vehicle that may follow behind the first which is restrained in the net.

It is an object of the invention to provide a high impact gate that is readily movable but provides high security.

It is also an object of the invention to provide a high impact gate that overcomes or at least ameliorates the problems of the prior art.

SUMMARY OF THE INVENTION

In accordance with the invention there is provided a high impact gate system including a lower reinforced elongated structure and an upper barrier means sized to extend across a roadway, and two spaced reinforcing means able to be positioned to at least partially overlap respective end portions of the elongated structure when the lower structure is in a closed position extending across the roadway, the reinforcing means able to provide supporting reinforcement to the elongated structure when receiving impact by vehicle or the like.

The high impact gate includes a lower structure sized to take the impact of a vehicle, the lower structure formed by two spaced linear structures joined by cross bracing to form a high impact barrier. The spaced linear structures can be "I" beams and the bracing can be cross diagonal bracing.

The spaced linear structures extend substantially horizontally with the diagonal bracing being in a vertical cross section. Preferably the cross bracing extends between internal vertices of a vertical cross section of the spaced linear structures to provide bracing in at least two directions.

The lower structure of the high impact gate can include a first end part mounted on a sliding mechanism and allowing the distal second end to be cantilevered such that the second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway.

The sliding mechanism can include one or more ground engaging rollers mounted on a reinforced base adjacent to the roadway.

Also there is provided a high impact gate including a lower structure and an upper section mounted on the lower structure, the lower structure sized to take the impact of

a vehicle and the upper section providing a vertical barrier, the lower structure formed by a boxed structure having two spaced linear structures joined by cross diagonal bracing to form a high impact barrier. The spaced linear structures having "I" beams and extending substantially horizontally with the diagonal bracing being in a vertical cross section. The lower structure can include a first end part mounted on a sliding mechanism and allowing the distal second end to be cantilevered such that the second end can extend at least partially over a roadway to prevent unauthorized entry and the sliding mechanism allows sliding out of the way for authorised entry along the roadway. The sliding mechanism preferably includes one or more ground engaging rollers mounted on a reinforced base adjacent to the roadway.

The invention provides a method of mounting a high impact gate, the method including providing a gate including a lower structure sized to take the impact of a vehicle, the lower structure formed by two spaced linear structures joined by cross bracing to form a high impact barrier; providing two sets of buttresses on either side of a roadway upon which high security authorized access is required; mounting the gate on a sliding mechanism extending between the two sets of buttresses such that the buttresses provide a strengthening aid for the high impact gate when the lower structure is struck and the buttresses provide a linear control of the sliding mechanism.

The buttresses can be mounted to solid weighted bases with the buttresses having an outwardly angled supporting structure having a base portion further from the lower structure than a top portion to provide the supporting structure while also providing a deflection mechanism to the impact of a motor vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention can be more readily understood an embodiment will is described by way of illustration only with reference to the drawings wherein:

Figure 1 is an illustrative diagrammatic perspective view of a high impact gate in accordance with a first embodiment of the invention;

Figure 2 is a front elevation of the high impact gate of Figure 1 from the unsecured side;

Figure 3 is an overhead plan elevation of the high impact gate of Figure 1;

Figure 4 is a front elevation of a high impact gate of Figure 1 from the secured side showing extra security walls protecting the non roadway features of high impact gate when in a closed position;

Figure 5 is an overhead plan elevation of the high impact gate of Figure 4 with extra security walls;

Figure 6 is an illustrative diagrammatic perspective view of a high impact gate in accordance with a second embodiment of the invention showing construction of lower structure;

Figure 7 is a front elevation of the high impact gate of Figure 6;

Figure 8 is an overhead plan elevation of the high impact gate of Figure 6;

Figure 9 is a vertical cross section of the upper section, lower structure and base of the high impact gate of Figure 6.

Figure 10 is a partial vertical cross section of the lower structure of the high impact gate of Figure 9 showing a buttress and lower structure construction; and

Figures 11A, 11B and 11C are side elevation of first buttress and elevation of both first and second opposing buttresses and side elevation of second opposing buttress of another embodiment of opposing buttresses to the configuration of Figure 9 ;

Figure 12 is an illustrative diagrammatic perspective view of a high impact gate in accordance with a third embodiment of the invention having top electric fence;

Figure 13A and 13B is an elevation from unsecured side and a cross sectional view through X-X of Figure 13A of the high impact gate of Figure 12;

Figure 14 is an overhead plan elevation of the high impact gate of Figure 13;

Figure 15A and 15B are a diagrammatic elevation from secured side of lower structure of high impact gate showing its reinforcing construction, and a plan view of Figure 15A of a lower structure of the high impact gate of Figure 12;

Figure 15C 15D and 15E are a cross sectional view through X-X of Figure 15B showing the drive rack connection to the lower structure of the high impact gate and a details of A and B of Figure 15A and 15C;

Figures 16A and 16B are an elevation and plan view of the rail and foundations along which the lower part of the high impact gate is supported and slides in accordance with the invention;

Figure 16C is a cross sectional view through X-X of Figures 16A and 16B.

PREFERRED METHODS OF PERFORMING THE INVENTION

Referring to the drawings, there is shown a high impact gate system 11 including a lower reinforced elongated structure 21 and an upper barrier means 31. The lower structure 21 and barrier means 31 are sized to extend across a roadway.

Two spaced reinforcing means 51 are positioned to overlap respective end portions of the elongated structure 21 when the lower structure is in a closed position extending across the roadway. The two spaced reinforcing means 51 are two spaced sets of opposing buttresses closely fitting with the elongated lower structure. The reinforcing means 51 are able to provide supporting reinforcement to the elongated structure 21 providing the strength of the gate when receiving impact by vehicle or the like.

The lower reinforced elongated structure 21 and an upper barrier means 31 of the high impact gate system 11 are supported in cantilever manner by a foundation means 41 including a track to allow sliding movement of the gate. A control and drive system controls and drives the moving high impact gate.

The gate design as a minimum is capable of repelling a 7 tonne truck travelling at 80KPH. The adopted stopping time is one (1) second.

The fundamental parts of the high impact gate of the invention include:

a) lower structure of gate

The lower structure 21 is formed by a boxed structure having two sets of parallel opposite spaced linear structures 22A, 22B, 22C and 22D joined together to form an elongated box of a usual size of 4000 x 1000 x 300 millimetres. Cross diagonal bracing 25A and 25B usually every 500 mm along its length is included to form a high impact barrier. The size of the box structure is primarily determined relative to the roadway to be protected.

The lower structure is formed by two spaced linear members joined by cross bracing. The spaced linear members extend substantially horizontally with the diagonal bracing being in a vertical cross section. In the embodiments the spaced linear members 22A and 22B are I-beams with the ends of the I-beams being parallel which together with plate sheeting form a front and back surface of the lower structure 21. The cross diagonal bracing extends between internal vertices of the I-beams.

The invention therefore provides a cantilevered style high impact gate leaf weighing about 1.6 tons and comprising of two "I" beams braced and designed to withstand the impact of a 4 ton truck at 30 kilometres per hour. This can be scaled up to for example, impact from a 10 ton truck at 80 kilometres per hour. The bracing of the twin "I" beams with a cutting edge facing the unsafe side of the gate is a novel design and capable of not only destroying a vehicle on impact but also not yielding as a result of a collision.

The heavy structure is sufficient to take the impact of a vehicle.

b) upper section of gate

The upper section provides a barrier means 31 and includes a variety of forms that can be attached to the upper part of the lower structure 21. As shown in Figures 1 and 6 there is an upright, rigid, rectangular frame having spaced vertical bars. The vertical bars are spaced sufficiently close to each other so as to prevent access to a person passing through the upper section. The upper section is of such a height that it is not readily climbed. In addition, there are no cross-members that can serve as foot-holds to aid climbing.

Another form of barrier means 31 is shown in Figure 12 which together with spaced vertical bars is a top electrified wire fence to continue the electrified wire system if the adjacent fencing.

c) a cantilever mounting including a foundation means

The cantilevered means 41 has a foundation sized to be able to support the elongated lower structure in a cantilevered manner. The lower structure includes a first end part

mounted on a sliding mechanism mounted on an elongated foundation located in line and below the level of the lower structure and adjacent the roadway wherein the distal second end of the elongated structure is cantilevered such that the second end can extend at least partially over the roadway to prevent unauthorized entry and the sliding mechanism allows sliding along the foundation out of the way for authorised entry along the roadway.

The first end part of the elongated structure is captively connected in a sliding manner to the reinforced base adjacent to the roadway to provide the cantilever foundation and the sliding mechanism includes one or more rollers.

The cantilever means of the high impact gate includes a track to allow sliding movement of the gate. The principle of this cantilever gate is a gate leaf supported by a front roller and protected in a buttress and connected to the foundation and a rear track via a roller trolley. The twin "I" beams can be held in a cantilevered position in the roller trolley, which is held under an inverted "L"-shaped track that is mounted rigidly in an elongated base. By this arrangement, the gate pivots around a fixed base roller.

d) Two spaced sets of opposing buttresses

Two spaced reinforcing means comprise pairs of opposed buttresses able to be positioned to at least partially overlap respective end portions of the elongated structure and closely fit on opposing sides of lower structure when the gate in a closed position extending across the roadway, the reinforcing means able to provide supporting reinforcement to the elongated structure when receiving impact by vehicle or the like.

The buttresses are triangular buttresses with each pair of opposing buttresses is mounted on a common base. The common base of each pair of buttresses is a weighty foundation means. Both sets of gate buttresses and the back rail of the gate system are bolted onto a solid concrete weighted base. The concrete base is sufficiently engineered to provide solid support to the gate mechanism and the two sets of buttresses and absorb vehicle impact.

When the gate leaf is in the closed position, the end section of the gate leaf is located in the other of the set of buttresses on the other side of the roadway so as to withstand high impact. The buttresses are arranged so that at least the lower structure of the gate is snugly fitting within the sets of buttresses to allow the sliding motion of the gate as it opens and closes; but also to assist in providing high impact support to the overall gate structure.

e) A control and drive system

The gate is powered by a three phase 4 kilowatt brake motor and is capable of opening and closing speeds of about 1 metre per second. The motor and electronics are housed within one of a pair of angled steel buttresses from which the motor drives the gate leaf via a steel rack.

The high impact gate forming the cantilevered sliding gate systems of the invention provides an access controlled power operated very high impact cantilevered vehicle sliding gate systems. The vehicle sliding gate systems are to be controlled by access control cards and voice communication systems as specified and shown on the drawings. The objective of this project is to safely restrict access by unauthorized personnel, cars, vans and light, medium and heavy sized trucks.

Each cantilevered slide gate system comprises a single leaf fully extending across the relevant road opening. These systems maintain a height equal to the existing fences or walls. The approximate erected height is 3000mm. The vehicle gates are equipped with an electric drive motor, gearbox, guide roller systems, vehicle and pedestrian safety devices and power fail gate locking brake system. The system is reliable, functional and is based on the improved technology for the performance systems.

Each high impact gate of the invention can cover about a 5.0 metre road opening. Optimum road width is 4.0 metres. Each high impact gate of the invention gate system has as standard a monitored UPS system with full line conditioning and alarm features. The UPS to be capable of up to 5.0 full operations during power failure. Each high impact gate of the invention has a safety cage/ fence or tube as standard.

The gate system is capable of travel speeds of 1.5 metres per second; however set up speed of 1 metre a second is anticipated. The system is 100% duty cycle.

The system provides data and control cables to suit each gate situation i.e. card system and voice communication. It also provides a 240 volt 15Amp circuit to power each sliding gate system and associated equipment. This is from the nearest suitable existing switchboard. All necessary conduit work associated with the cabling is to all the relevant Australian Standards (i.e. electrical orange, data white). The system allows conduit and cable all equipment points at each gate intersection so as to interconnect these locations.

The system substantiates the design crash calculations by undertaking of independent mathematical calculations and crash testing to T4 independent calculations and approval.

The systems provided overall are the latest in technology and upgradeable without major parts redundancy. It is a formidable barrier, heavier in construction. All operations are smooth. Each gate system satisfies all safety requirements for entry and exit of vehicles and the occasional pedestrian.

Examples of parts of high impact gate of the invention forming a cantilevered sliding gate system include:

1 Sliding Gate System Metalwork

Each high impact gate of the invention gate system consists of the following metal work items. One bottom gate leaf, one top gate leaf, two buttress, one back rail, roller brackets, sheet metal cover sets, sheet metal infill and fixings.

All items are manufactured utilizing heavy duty materials. All items are fully seam welded. All items are sand blasted and painted after manufacturing and cleaned as required to give a smooth even finish. Paint colour to be advised.

The material sizes of one form of preferred embodiment are:

Gate Frame	100 x 100 x 5mm RHS
Bottom Gate Frame	310 I Beams & 150 Angle iron
Bottom Gate Buttress	100 x 100 x 5mm RHS
Back Rail	Twin C Channels
Gate Vertical Bars	26.9 O.D Round Tube or mesh

The maximum spacing between all vertical bars are 125mm.

The erected height of each gate system is usually about 3000mm. This should consist of 200mm maximum ground clearance and 2800mm of gate height. Each top gate frame is 1600mm from the top of the gate frame to the bottom of gate frame. All vertical bars are fully welded. The width of each gate opening does not exceed 5000mm. Each gate system is constructed such that it is a bolt together assembly.

The main equipment buttress consists of four vertical 100mm squared RHS sections connected top and bottom to form a solid full height support tower and equipment enclosure. Each buttress height is 1200mm, the width should is 1200mm. The motor buttress then is sheet metal clad, the front face is covered by the use of a full height hinged service access door, and this door is key lockable using skeg endorsed padlock. The gate main buttress service door always is on the secure side of the property. All sheet metal covers and doors are a minimum of 5mm thick.

The gate system is bolted to its relevant concrete footing using M 24mm x 125mm chemsets (zinc plated).

2 Drive Rack

Each gate system uses drive rack for power transfer. The drive rack used with each gate system is zinc plated mild steel. The drive rack is welded to the underside of the main member of the sliding gate frame. All drive rack is inverted so as not to collect grit and dirt. This rack directly meshes with the motor output shaft drive cog. The rack is 50mm wide.

3 Drive Cog

Each gate drive motor gearbox has a brass drive cog fitted directly to the motor/gearbox output shaft. This drive cog is keyway fitted and is no larger than 120mm in diameter. The bore size of this drive cog should is a minimum of 40mm.

4 Guide Rollers

Each gate system is fitted with gate buttress guide rollers (total 8 of). Two mounted to suit the top rail of the gate and two to suit the bottom rail. Each of these rollers is fitted with two sealed bearings. The roller size is a minimum of 100mm x 150mm diameter. These rollers should is made from black UV resistant nylon. Each guide roller has a 25mm diameter mounting pin/ bolt.

5 Main Rollers

Each gate system is fitted with two main rollers and two back trolley rollers. The front main roller body is zinc plated mild steel. Each roller is fitted with two sealed bearings and a 30mm mild steel axle. The minimum load rating on the main roller is 80 tonnes. The two back trolley rollers each consist of a sealed bearing fitted to a zinc plated steel tyre. A rating each of 40 tonnes is a minimum requirement for each back trolley roller.

6 Drive Motor and Gearbox

Each cantilevered slide gate motor gearbox drive unit is a 3 phase, 4kW unit. These motor gearbox units are IP56 rated and are of true industrial grade and quality. This drive motor gearbox unit is rated for a minimum frequency of 100 operations per hour and/or 100° duty cycle. The drive motor system is suitable for the speeds as described under section 9 below with the cog size as described under section 3 above. The motor gearbox drive system is to utilize and inbuilt safety mechanism to protect the unit from excessive drive torque. A power fail brake system or lock is built into this drive motor gearbox system. This locks the gate in the closed position and locks the gate during power fail. The motor gearbox and platform assembly bolt together and this assembly is set up to engage the drive racking which is mounted on the horizontal main member of the gate frame.

7 Electronic Equipment Enclosure

Each gate control logic module is housed within an IP56 steel or poly enclosure, size is no less than 800 x 600 x 200mm. Each enclosure has a hinged door and key locking system. Each of these enclosures house a true PLC, frequency invertor, power supply, loop detector, GPO, test button, buzzer and misc items such as duct, cable etc. to suit the relevant sliding gate system electronic control.

All equipment mounted within these enclosures is installed on din rail. All cabling within each enclosure where practical is trunked within duct. No equipment is mounted on the enclosure door. All cable penetrations have proper glands fitted. An electrical schematic is installed within a plastic sleeve on the inside of the enclosure door.

All gate logic control modules are installed within the protection of the sliding gate main tower adjacent to the drive motor location. Each equipment enclosure door is numbered and a site location is nominated. The distribution point for the relevant power feed also is nominated on this door. All labels are screw fixed trefolite type.

All work within these cabinets, conforms to all the relevant Australian Standards.

8 Programmable Logic Controller - PLC

Each gate motor drive system is PLC controlled utilizing a compact PLC. Each PLC is fully programmable and has a minimum total of 14 inputs and outputs including 8 outputs and 6 inputs. These control units are capable of being reprogrammed on site after installation for possible further ancillary functions. Each PLC must be expandable if required and offer possibilities of networking. All safety systems described is constantly monitored by this PLC system. The background for the proposed program utilized on each gate PLC is field tried and proven for a minimum of five years.

9 Frequency Inverter

A frequency inverter is utilized on each gate system. This frequency invertor is utilized for the control of gate operating speeds and control the ramp up and ramp

down settings. These units are suitable for use on up to 4kw motor ratings. Each frequency invertor is set up to display reliable speeds of 2000mm per second gate travel. Each frequency inverter has a built in program keypad which should remain with the gate system after programming and commissioning. A breaking resistor is also a standard requirement for this system.

10 Inductive Loop Detector

Each sliding gate system include within the relevant equipment enclosure a single channel inductive loop detector; this loop detector have two inductive loops connected to it so as to provide vehicular safety and auto closing. The cable tails from the two inductive road loops have conduit into the equipment enclosure within the confines of the main tower to the relevant loop detector.

11 Power Supply

A switching power supply is installed in each gate system control logic module. This power supply is din rail mounted and suitable for industrial applications. These power supplies are of a regulated type i.e. voltage drop off with over current.

12 Test Button

Each equipment module has a din rail mounted test button installed within the enclosure. This button has a trefolite test button label mounted below it. This button when depressed will pulse the gate system open. Closing is automatic through the safety systems and or time out facility.

13 Miscellaneous Items

Each gate control logic module has a GPO fitted. This item will need to be din rail mounted.

14 Safety Buzzer

Each sliding gate system is fitted with a suitable low voltage, audible buzzer to announce gate movement. The buzzer is controlled by the gate system PLC. The buzzer must sound 1 second prior to gate movement and continue to pulse sound at 1 second intervals during the full open and close cycle for the relevant gate.

Each gate buzzer is fitted to the outside of the control equipment enclosure. This buzzer is designed to warn pedestrians who may is close to the gate system that the gate is about to move. This buzzer is not to be excessive in noise level.

15 Safety Flashing Light

Each sliding gate system is supplied with two flashing red low voltage strobe lights, which is fitted to the top of the main gate housing. This strobe light will is controlled by the gate system PLC. It is to flash 1 second prior to gate movement and continue to flash during the full open and close cycle for the relevant gate. All cables from the strobe unit have conduit to within the main gate housing to the control logic enclosure module.

16 Uninterruptible Power Supply - UPS

An uninterruptible power supply is the standard power fail override facility for this gate system. The system offers alarm outputs as required. i.e. low battery, etc. The system should also offer full power filtration. It is expected that 30 full operations is the standard capability for this system.

17 Safety Photo Electric Beams

A series of fail safe photo electric beams are utilized to provide adequate safety measures for pedestrians. Each sliding gate system has four photo electric safety beam sets fitted. These beams must be transmitter to receiver type and is proven in performance and reliability. All PE beams must be constantly monitored by the relevant gate PLC. Should a PE beam unit fail, the system must recognise this and shut down the gate system immediately. Similarly, should a beam is blocked by a person or vehicle the system should stop and re open and wait until clear, prior to any gate closure. All beams are set up as safety reopen.

18 Proximity Sensors

Two cylindrical proximity sensors and bars are utilized to determine and control the gate position. These proximity sensors are set up to detect the proximity bars as secured to the bottom rail of the gate system. These provide position sensing for the

gate system. The cabling for the proximity sensors are installed in conduit up and into the control logic enclosure. The proximity sensors are set up within the confines of the lockable main equipment tower. These requirements are so that the gate system does not become lost or confused.

19 Safety Inductive Loops

Each sliding gate system has two in ground inductive loops cut into the existing road surface. These loops will is to provide vehicular safety and auto closing. The two loops are connected into the inductive loop detector within the equipment enclosure. Each loop should is set back at least 1000mm from the edge of the relevant sliding gate and cover at least 60% of the road width.

20 Safety Fence and General Fencing

Each sliding gate system as installed have the existing fencing connected to the new gate buttress to secure the site properly. This fencing matches that which exists. An additional section of fence is installed to section off the back rail gate travel area. This safety fence is full height and matches that which exists i.e. cyclone mesh style. This enclosure is 1 metre wide and has a padlock style swing gate fitted for service access reasons. This gate is padlocked upon commissioning of the automatic gate by the end user.

21 Concrete Foundation

Each sliding gate system has substantial concrete footing installed to suit the relevant gate. All conduit entries are set into the correct position prior to the concrete installation. All concrete is minimum 25mpa. This work is performed by relevant trades persons to all Australian Standards. The concrete foundations are installed accurately as to the engineering design.

22 Equipment Pedestals

Each sliding gate system has two dual height equipment pedestals. These pedestals are 2000mm high, flange mounted and constructed of 100 square RHS. Each pedestal has a weather shrouds made from folded sheet metal. All pedestals are hot dip galvanized and painted safety yellow. The equipment shroud plate is 300mm square,

this to suit the intended proximity card reader and intercom station installation. One pedestal is for the entry location and one for the exit location. The pedestals are positioned on the driver's side edge of the road and is not closer than 4 metres from the face of the relevant automatic sliding gate system.

23 Bollards

Each sliding gate main housing will have two protective bollards installed to avoid damage to the main housing by vehicles. These would be placed within 500mm of the main housing on both vehicle approach sides. Each protective bollard is heavy duty in construction. Each bollard should is 1000mm high and constructed using heavy duty wall 200mm pipe, these is flange mounted and capped. Each bollard is hot dip galvanized and painted safety yellow.

Whilst the gate mechanism is designed to open and close in a sliding manner via switches and electrical control signals sent via access control systems, the system is novel in the manner in which it provides safety to both vehicles and pedestrians. The safety devices includes flashing lights, audible warning buzzer, two inductive loops for detection of vehicles and two photoelectric beams for detection of pedestrians.

It can therefore is seen that the gate system provides an improved structure that can withstand high impact buy a vehicle. This is provided in the preferred embodiment by the use of "I" beams and the engineering of the diagonal internal bracing which is unique.

The high impact gate of the invention is unique because it's the only product on the market that meets all threats (see above). It is a high-speed cantilever design capable of 2.0 metres per second opening and closing speeds. It is the only product capable of providing operations with full safety. It appears to be the only Australian product to be crash tested that will meet and exceed US K12 Standards. Therefore it is the only product that will stop a 7-ton truck at 80 kilometres per hour.

The high impact gate system is the only product that does not require major road works involving the excavation of the driveway to install pits, formwork and concrete

works, drainage systems, water pumps, hydraulic rams etc. Problems with pits include, stagnate water, mud deposits, exposure of metals to moisture, and more frequent servicing requirements. The concrete foundations for the high impact gate of the invention are an integral part of the gate design and provide strength and stabilization qualities against impact. However the foundations are primarily off the roadway. The weight of the concrete is approximately 20 tonnes.

The high impact gate of the invention is an economical solution when compared with combinations of devices such as raising bollards/raising steps and indeed conventional gates. Unlike raising steps the high impact gate of the invention provides anti-ram protection upon entry or exit unlike rasing steps. The high impact gate of the invention may have the safety devices manually overridden for emergency operation.

The automation high impact gate of the invention includes Uninterruptible Power Supply (UPS) systems.

Some important features of the high impacts gate system are that it has anticipated strength to repel 15 tonnes at 100KPH. Strength of structure and components (stopping power) enables stopping of all perceived threats from pedestrians, motor bikes, cars, light trucks to heavy trucks. Designed for high level stopping performance of heavy trucks (1 second anticipated).

There is an extreme duty cycle for peak periods and busy applications (100% duty cycle with reliability). Maximum levels of safety systems for high level proactive safety performance (not reactive style systems). Full override facilities are provided via PLC programs for safety overrides, fire alarms, and lock down modes. PLC controlled for systems up grade and flexibility. Standard override to disable safety switches (lockdown mode). Gate travel speeds of up to 2.0 metres a second, speeds being variable. The system operation is smooth, efficient and well balanced.

The design is a modular design capable of 1 day installations or relocation (rapid deployment).

The system also provides a highly visible deterrent when in the closed position. It covers up to 5.5 metre road width with no road tracks (optimum size 3.5) i.e. for single lane applications. This is allowed by the full cantilevered design which is attached to the back rail system at all times i.e. systems cannot be dislodged or fall over. The system is designed to be installed above ground so minimising in ground environmental problems i.e. less service drains or pumps not required.

Twin buttress style design to fully secure the system when in the closed position (penetration in end buttress 1 metre). The system is designed to repel attack or impact from both directions, not just one direction, like rising step barriers.

A brake motor is utilised for positive locking of the system when closed. A 240 volt supply is the power requirement to the UPS. The UPS provides 240 volts to the gate inverter which then supplies 415 volts to the brake motor (so power feed is cost effective). Each system has a standard uninterruptible power supply with up to 30 operations available during power outages (true stand alone capacities). The system can be programmed to fail closed or open after the UPS is spent, or as in some cases, lock as soon as power fails this then is controlled by key switches in remote locations

Potential for blast mitigation with twin skin design on system.

All systems have as standard, sheet metal or aluminium cladding. Thus making each system aesthetically more pleasing stronger and, importantly, safer by reducing pinch points. All systems are sandblasted and painted to the customers requirements. Safety and anti tamper tubes are available to further enhance each system.

It should be understood that the above description is of a preferred embodiment and provided by way of illustration only. Clearly a person skilled in the art would understand variations to the invention without any inventive element and such are included within the scope of the invention as defined in the following claims.